

TxDOT Success Recognized

TxDOT is considered the leader in utilizing compost on highway construction and maintenance projects. TxDOT currently specifies compost more often than any other state DOT. TxDOT is the largest market for compost in the nation. Although several states also utilize compost, few have actual specifications, and none are as detailed as the TxDOT specifications.

TxDOT has received rave reviews by:

- Nora Goldstein, Executive Editor Biocycle
- US Composting Council
- "...a model we would like to see emulated nationwide," - Jean Schwabb, USEPA
- FHWA 2003 Environmental Excellence Award Nominee

TxDOT and the TCEQ have laid the groundwork for the effective use of compost well into the future. By establishing and demonstrating effective methods for application, and by identifying viable compost producers, as well as information to educate users about the qualities

The RC's "Successful" newsletter is a time sensitive continuous resourceful way to share valuable technology and/or information that can add to your programs/goals. If it made a difference for you or your customer, we want to know about it.

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and benefits of compost, these organizations have paved the way for compost use in TxDOT districts throughout the state as well as in setting a standard for other state DOTs.

The economic benefits to TxDOT are many:

- Results show that a slope with compost application is much more likely to establish grass quickly and not erode.
- Because compost holds moisture, there is less need for watering thus saving money.
- TxDOT saves money immediately, because achieving successful erosion control and revegetation means being able to remove construction barricades and let the contractor proceed with the next phase of work, or move on to the next project.
- Typically, the contractor must reseed at least a portion of most projects before TxDOT can accept completion of the job. Five percent of the project payment is typically retained until sufficient vegetative establishment occurs. This way, if erosion results because of a failure in soil-protection, TxDOT then pays the contractor to redo the job until vegetation is established.
- Future maintenance dollars are saved by avoiding slope and soil failures and can be better spent on the road instead of on future remediation. Thus, the cost effectiveness of using compost is seen in terms of the long-range impact and savings.
- On the construction side, using the compost specifications have created a market that has opened up a new sub-contracting industry in Texas. For slope applications, contractors use truck-mounted pneumatic pumps to apply compost material. *Three years ago, there were no contractors to do this kind of work in Texas, now there are 12.*
- Other less tangible economic benefits are associated with clean water and reduced environmental pollution.

TxDOT is utilizing compost, a valuable organic product, to reduce erosion. A major player in the State of Texas Compost Incentive Program, TxDOT is removing composted manure from a distressed watershed and applying it on highway projects in other areas of the state. In partnership with the TCEQ, TxDOT is helping to improve water quality by reducing nitrogen runoff from dairy farms, while at the same time establishing vegetation quickly, and reducing erosion on Texas highway projects to reduce sedimentation of waterways throughout the state.

Through the efforts of this project, TxDOT, contractors, city, state and national organizations, the general public and even the generators and suppliers of organic wastes (i.e., dairy farmers and municipal sanitation departments) are seeing the real value and benefits of a product that was once considered unusable waste.

FHWA wishes to acknowledge this great innovative path upon which TxDOT has embarked. By partnering with multiple agencies, they have achieved immeasurable stewardship and success; their quest for one solution benefited many and has resulted in creating an effective tool that can help protect all-around environmental quality, and especially the quality of transportation projects. *Congratulations TxDOT and all your partners for a job well done.* ●

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Environmental Stewardship in Construction & Maintenance

Innovative Soil Erosion-Control From The Lonestar State

Through programs initiated under the Clean Water Act and the 1991 Intermodal Surface Transportation Efficiency Act, the Federal Highway Administration (FHWA) along with the Environmental Protection Agency (EPA) have increasingly emphasized improvements in soil erosion control both during and after roadway construction and development. In many states, transportation agencies are implementing a variety of elementary and innovative soil and water conservation practices. In the Lonestar state, an award-winning Texas Department of Transportation (TxDOT) is literally generating heaps of attention for erosion control, while reducing heaps of organic debris from contaminating precious water resources and entering the solid-waste stream. In a close partnership with its sister agency, the Texas Commission on Environmental Quality (TCEQ), TxDOT is putting waste to work by utilizing formulations of organic compost to reduce soil-erosion and improve growing conditions for vegetation in the roadside environment both during and after construction. The success of this program comes from an even greater formulation; one of leveraging the missions and authorities of multiple state partners with available federal programs.

Effective erosion control seeks to arrest



Demonstration of Mill Creek applicator applying compost.

soil movement at its source and before it begins. Rapid revegetation of disturbed ground is recognized as one of the best and most economical solutions to minimizing the loss of soil and the resulting sedimentation and pollution of water resources. Broad application of quick-growing herbs and grasses from seed is the most common mechanism for slope revegetation on highway projects. Another common practice is the labor-intensive manual placement of harvested straw or erosion control blankets. In many parts of Texas, as with the rest of the United States, topsoil is either absent or depleted from years of agricultural use coupled with poor soil management. Often, new seed is simply placed onto bare mineral soils where the chances for establishment and survival of vegetation are poor.

The most fundamental part of successful erosion control is early revegetation of exposed soils. The provision of a 4-inch topsoil seedbed is considered an optimal condition for successful revegetation. However, as it is in many preconstruction,

and in most post-construction conditions, the only planting medium available is typically mineral soil with little or none of the organic material considered necessary to retain adequate moisture and provide nutrients needed to sustain vigorous plant growth. This condition ultimately leads to severe erosion on many projects. The consequences for failing to effectively control erosion are usually very costly in the short-term and may include fines in addition to remediation costs. Detrimental impacts over time to both water quality and quantity, become costs shouldered by everybody.

The proven material for establishing:



- Quick vegetation with
 - Lower costs,
 - Less water
 - Less maintenance and
 - Fewer headaches

What started out as an idea for an experiment has proven to be one of the Lonestar

-continued inside

State's most innovative ideas in finding an effective alternative for common erosion control measures. TxDOT quickly saw the dual benefits in using compost as an erosion-control tool; an important recycling objective could also be fulfilled.

TxDOT's compost alternative is comparable to the cost of reestablishing or introducing new topsoil, yet, provides a more effective erosion control solution by adding organic matter from an abundant resource to existing poor soils and amending them so that successful revegetation can occur. Through this practice, soil erosion is minimized or altogether avoided and time and money are saved that often would be expended for repeated topsoil and seed applications where growth failed to occur.

The ultimate result of uncontrolled erosion, or failed erosion control measures in highway construction practices comes from the contribution of what is widely referred to as nonpoint source pollution (i.e., contamination that comes from across a broader landscape rather than a point-source such as a pipe or industrial plant.) In the case of highway construction and maintenance, nonpoint-sources for pollution are caused primarily by sediment runoff from improperly maintained or vegetated sites. A recycled material of partially decomposed plant and organic matter, *studies have shown that compost can alleviate many erosion problems by providing a buffer from the energy contained in the impact of rainfall on surface soil stability.* Compost does this by dissipating the energy from that would otherwise loosen soil particles, and by giving plant roots a better medium to establish a foothold to reduce soil loss.

TxDOT's partnership with TCEQ, formerly the Texas Natural Resource Conservation Commission, focused on research, development and implementation to make this an effective compost application program. Recycled organic material, in the form of composted municipal yard wastes, biosolids and manure from North Central Texas dairy farms, is used to prevent erosion and reduce maintenance requirements of the state's right of ways. Environmental, economic and construction performance are the immediate recipients of the benefits of this technology. Using compost for soils management



Before and after the compost application was applied (within eight months).

has also resulted in solving regional environmental problems associated with solid waste volumes and nutrient runoff from dairy operations. For all of its benefits, Texas' COMPOST program was the recipient of the largest Clean Water Act Section 319 grant ever awarded by the EPA.

“Protection of the environment is much more than just avoiding sensitive areas, or replacing damaged ones. It must include the ‘little’ actions, which reuse valuable resources in an efficient, cost-effective, and productive manner. FHWA salutes TxDOT in their effort to make composting in the highway industry a standard, a standard, which will benefit not just the roadway users, but all our citizens.”

- Dan Reagan, Division Administrator
FHWA Texas Division

Why Compost

This alternative to traditional methods - such as erosion control blankets and straw mulch (these methods mostly controls sedimentation) has proven to be extremely effective in filtering stormwater runoff while retaining soil in-place. Since every construction project must prevent soil in the form of sand and silt from exiting the site with stormwater runoff, using this new technique allows TxDOT districts to make use of an abundant and certainly sustainable resource. In addition to developing uniform specifications for mixing

material over time. The workshop provide an overview of the specifications; and applying compost, TxDOT has coordinated and delivered numerous workshops and demonstrations for its districts and project contractors, whereby personnel can observe the effectiveness of the demonstrate the effectiveness of the material, the categories of compost available and applicable; and instruction on inspecting the material for performance consistency. These workshops and demonstrations have afforded TxDOT and municipal personnel as well as the contracting industry, with a first-hand opportunity to observe the erosion control benefits of its compost formulations. As local communities witness the successful application of TxDOT's program, they see that enabling local compost production of municipal yard waste can indeed be a viable alternative to allowing this important organic resource to meet a much less-useful fate in solid-waste landfills.

Some of the early results of TxDOT's compost program include:

- Suppliers/sources of usable compost have vastly increased.
- Workshops have been presented to over 700 TxDOT personnel at 22 district workshops.
- As workshops and demonstrations are completed, and quality results are seen from various demonstration projects, the use by districts continues to increase.
- During FY '01, TxDOT specified over 100,715 cubic yards of compost. That figure virtually tripled in FY '02, when over 300,000 cubic yards was specified. In FY '03, over 411,000 cubic yards was specified.

Other divisions within TxDOT have also embraced this new technology and have begun incorporating it into their construction and maintenance programs. The Vegetation Management Section of the TxDOT Maintenance Division has included a compost component in their revegetation training to the districts. The Environmental Affairs Division is including the specification of compost berms as a Best Management Practice to provide a filter for improved water quality. And the Bridge Division is also participating in research that will develop guidelines and specifications for the proper application and placement of compost filter berms. Many newspaper articles and industry publications have also highlighted the TxDOT Compost program (Appendix 4).

Adding Value

According to the United States Composting Council, ***"TxDOT has one of the more sophisticated and aggressive compost use and specification programs in the United States...."*** The use of a compost application program can benefit every state as well as contractors and the compost development industry. More importantly, it contributes greatly to the sustainable conservation of environmental resources while saving time and money.

By incorporating the abundant supply of cow-manure from North Central Texas dairy farms, TxDOT has also helped protect a major watershed by reducing the available excess nutrients that, carried by runoff, could wind-up in area streams, lakes and aquifers. Spray application of liquefied or semi-composted manure over dry land is a commonly practiced technique for dispersing nutrients in the form of an organic fertilizer. Overuse of this technique results in high-localized nutrient concentrations, the resulting runoff of which has caused severe downstream water pollution. Through the incentive of EPA's generous \$1-million grant, TxDOT and TCEQ was able to create a win-win situation for dairy farmers, state DOT districts and construction contractors by identifying both a sustainable source and ongoing application for composted organic wastes.

TxDOT has taken a great initiative to incorporate the compost program into the methods used in construction and maintenance.

"The TxDOT compost program is more than a promotion for environmentally sensitive construction techniques. The program reaffirms TxDOT's commitment to researching and developing new and more cost effective construction methods. The program's success is a result of establishing effective partnerships with governmental entities and private industry, seeking their input and assistance on technical matters and then working closely with them to develop an economically sustainable program that meets TxDOT's needs."

-- Ken Bohuslav
Director of TxDOT's Design Division

nance. Through its combined efforts with the TCEQ, TxDOT has become one of the first state DOTs with official specifications for the use of composted organic material (Specification Item 1027, Furnishing and Placing Compost, was approved in January 1998.) Standard Specification Item 161, "Compost" will appear in the 2003 Specification book.

Proven Performance

TxDOT first applied the compost method to a slope on Interstate 20 in Big Spring that had been plagued with erosion problems since 1968. Over the years, TxDOT used other traditional erosion-control products that temporarily protected the slope, but did little to resolve the poor-quality soil. After applying, a blend of compost and wood chips to a portion of



The photo on the left illustrates what can happen when water fails to penetrate the silt fence. Photo on the right illustrates run-off successfully filtered through the compost filter berms.

the slope, the results were nothing short of astounding. Within eight weeks following application, the resulting establishment of vegetation proved the success of compost. TxDOT found that applying compost is the new key to slope stabilization.

Participating Organizations:

The implementation of the Compost Program required the combined efforts of state and federal agencies:

- Environmental Protection Agency (EPA)
- Texas Commission on Environmental Quality (TCEQ)
- US Composting Council
- TxDOT district and division employees (Design, Construction, Maintenance), highway contractors, municipal and private compost producers

The principal partners in implementing the program were:

- Texas Commission on Environmental Quality
- Texas Department of Transportation

Impact to Date in State

The benefits of the successful implementation of this compost program can be seen in several ways;

- Along with the increased usage of compost for revegetation and erosion control, the TxDOT program has also established an effective use for abundant organic wastes that would otherwise take scarce space in solid-waste landfills.
- Numerous districts have been informed of and shown the effectiveness of compost to remedy erosion-prone areas
- In addition, the use of compost by a consumer as large as TxDOT, has created a market for the product where once there was none.

